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Laben

[11] **3,850,099**

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[54] **WASHING ROLLER AND WIPER BLADE MECHANISM FOR DUPLICATING MACHINES**

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[73] Assignee: **A. B. Dick Company,** Niles, Ill.

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[52] **U.S. Cl.** **101/425,** 101/366, 15/256.51

[51] **Int. Cl.** **B41f 35/04**

[58] **Field of Search** 15/256.5, 256.51; 118/70, 118/104, 230; 101/425, 157, 169, 365–366

[56] **References Cited**

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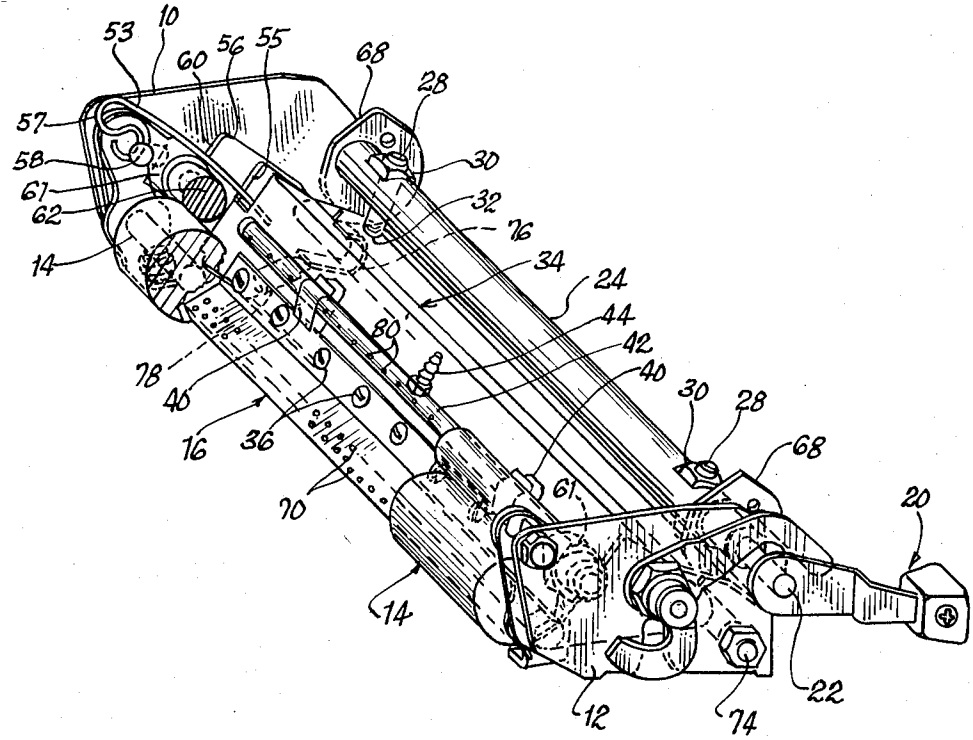
Primary Examiner—Robert E. Bagwill

Attorney, Agent, or Firm—McDougall, Hersh & Scott

[57] **ABSTRACT**

A duplicating machine or the like wherein a blanket cylinder or other surface subject to contamination by duplicating inks and the like is provided with means for periodically cleaning the surface. A washing roller is adapted to apply cleaning fluid to the contaminated surface, and a wiper engages the washing roller for purposes of removing cleaning fluid after the cleaning fluid has been in contact with the surface to be cleaned. The wiper comprises an elongated blade extending parallel with the axis of the washing roller and including means for holding the blade in engagement with the washing roller. The blade defines a plurality of perforations in the area of engagement with the washing roller whereby contaminated material including the used cleaning fluid is adapted to pass through the perforations during contact of the blade with the washing roller whereby the washing roller is prepared for receiving unused cleaning fluid.

10 Claims, 5 Drawing Figures



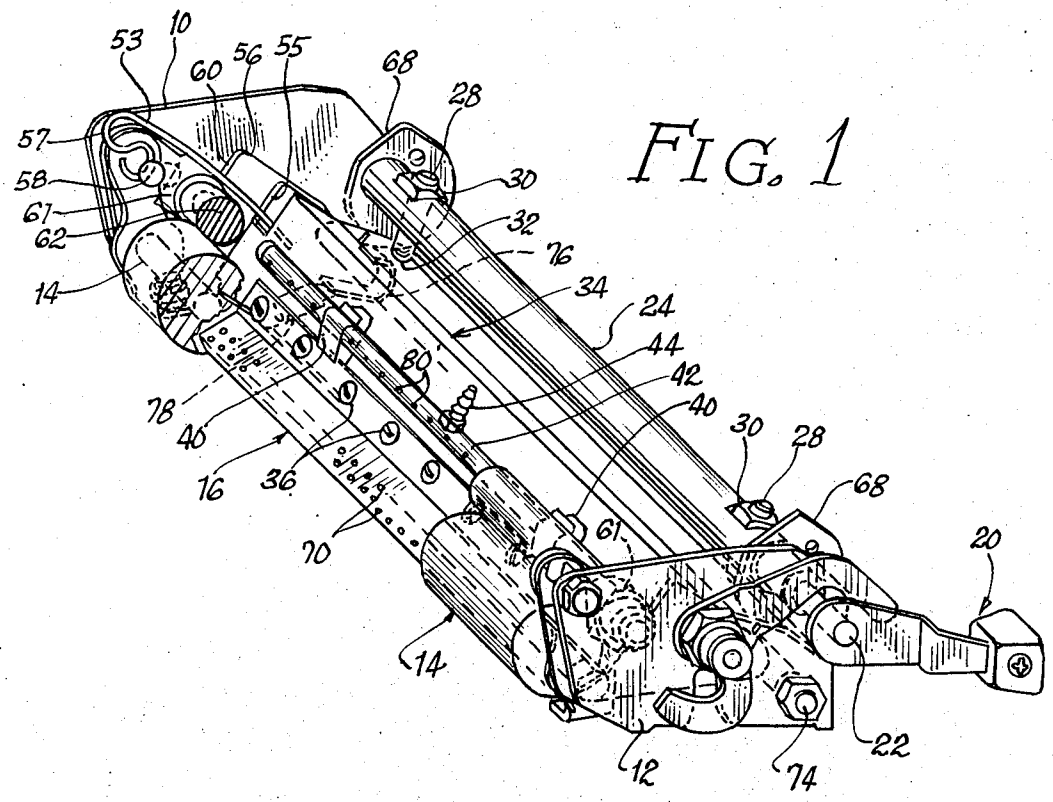

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FIG. 1

FIG. 2

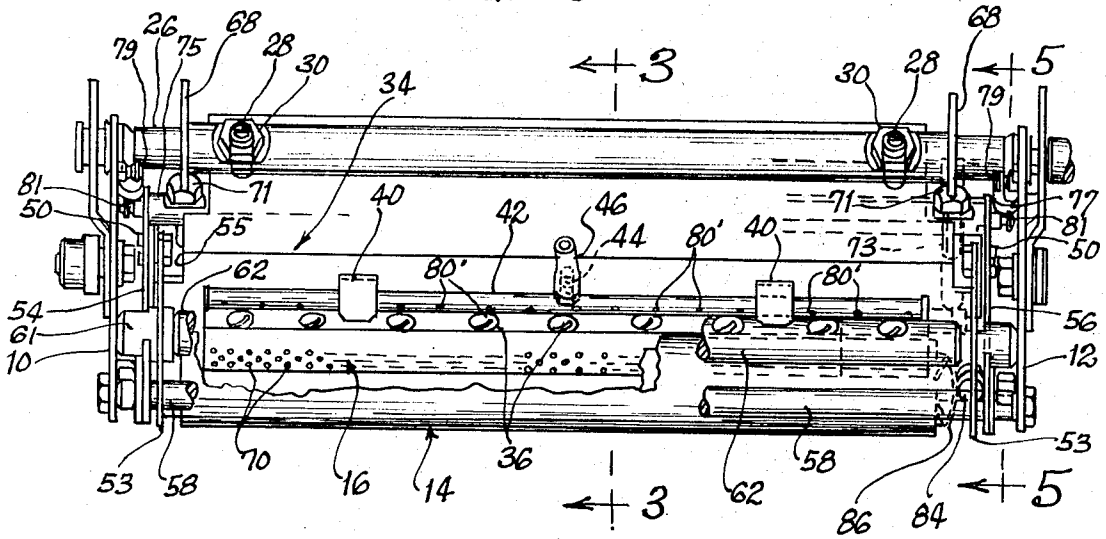

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FIG. 3

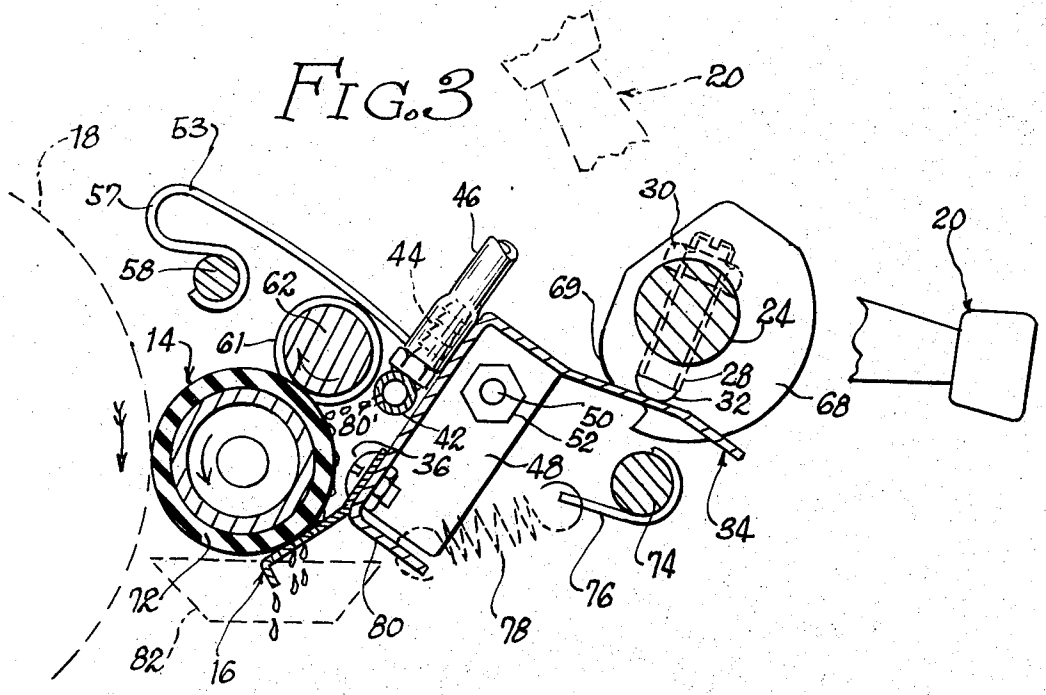


FIG. 4

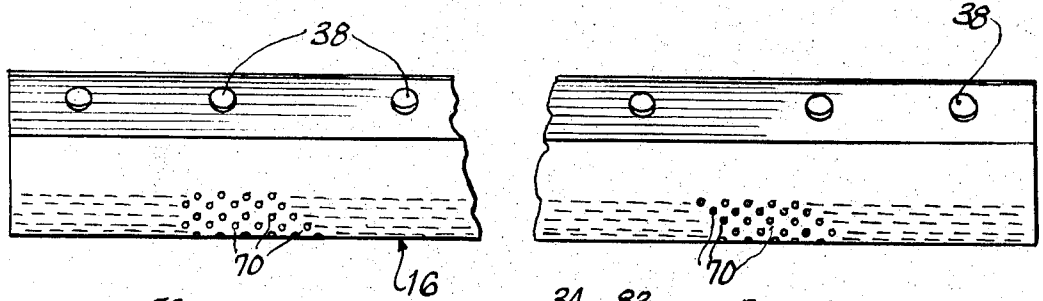
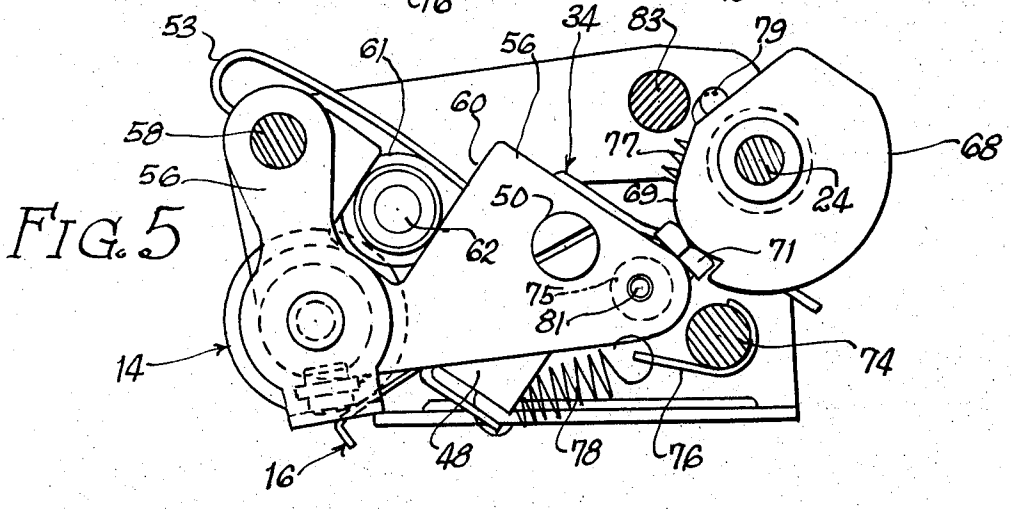


FIG. 5



WASHING ROLLER AND WIPER BLADE MECHANISM FOR DUPLICATING MACHINES

This invention relates to duplicating machines, and in particular to a cleaning system for removing ink and the like from a blanket cylinder or other contaminated surface of the duplicating machine. The invention is specifically concerned with improvements in a washing roller and a wiper blade associated with the roller whereby cleaning fluids utilized in the washing operation can be removed from the washing roller so that fresh cleaning fluid can be utilized for continued operation of the washing roller.

In duplicating machines, for example, duplicating machines of the offset type, a master cylinder is provided for carrying a master printing sheet, and a blanket cylinder is positioned adjacent the master cylinder for receiving an inked image from the master sheet. An impression cylinder is utilized for purposes of transferring the inked image from the blanket cylinder to a copy sheet. Each time a run using a master has been completed, the master is removed and the machine prepared for a different master printing sheet. One of the preparation steps involves the removal of the inked image from the surface of the blanket cylinder.

Prior art blanket cleaning arrangements have included various systems for applying cleaning fluid to the blanket cylinder. For example, a model 369 duplicating machine manufactured by A. B. Dick Company provides a wick positioned to deliver cleaning fluid from a trough to a scrubbing roller which in turn engages the blanket cylinder. In another system as described in U.S. Pat. No. 3,102,470, a roller is partially immersed in a trough of cleaning fluid communicating with another roller whereby the cleaning fluid is transferred to the latter roller which contacts the blanket cylinder whereby the cleaning fluid is transferred to the blanket and contaminated fluids are carried back to the trough.

In such prior art systems, the same trough used to store the cleaning fluid is also caused to collect the ink contaminant. This progressively increases the amount of contaminant in the cleaning fluid and in high speed automated duplicating machines where many changes of masters and blanket washes are required, the accumulation of contaminant in the cleaning fluid is rapid. Accordingly, only the first cleaning will give a truly uncontaminated blanket wash.

In these prior art systems, it is also necessary for the operator to handle dirty cleaning fluid. Since this is an unattractive job, there is a tendency to neglect servicing of the cleaning fluid reservoir whereby the reservoir is not replenished with new fluid to the extent necessary for providing consistently good printing. Another difficulty arises due to the fact that it is often necessary to run inferior copies before the effects of excessive contaminant in the blanket wash becomes apparent to the operator.

A system which provides distinct improvements when compared with the aforementioned prior art systems is described in Cleybergh application Ser. No. 260,101 entitled "Clean Fluid Washing System for Duplicating Machines and the Like". This system provides a surface cleaning assembly for removing contaminants during a cleaning cycle comprising a washing roller of elastomeric material and a metering roller. A wiper is positioned for engaging the washing roller subsequent to the contact of the washing roller with the surface to be cleaned. The wiper comprises an elastomeric material and defines an arcuate configuration to overlay a peripheral portion of the washing roller thereby providing a rubbing action to clean the washing roller. The combination of the wiper and roller define a fluid reservoir which receives cleaning fluid whereby the fluid can be transmitted between the metering roller and washing roller to the surface to be cleaned. The result is that the wiper removes the cleaning fluid containing contaminants thereby preparing the washing roller for picking up fresh cleaning fluid from the reservoir.

It is a general object of this invention to provide a combination of a washing roller and wiper blade which is particularly suitable for the efficient operation of duplicating machines.

It is a more specific object of this invention to provide a combination which provides certain improvements with respect to the aforementioned Cleybergh application while also overcoming difficulties experienced with prior art developments.

These and other objects of this invention will appear hereinafter and for purposes of illustration, but not of limitation, specific embodiments of the invention are shown in the accompanying drawings in which:

FIG. **1** is a perspective view of a mechanism including the washing roller and wiper blade combination of this invention;

FIG. **2** is a top plan view of the mechanism of FIG. **1**;

FIG. **3** is an enlarged cross-sectional view illustrating the major components of the mechanism in terms of the subject matter of the invention taken about the line **3—3** of FIG. **2**;

Flg. **4** is a fragmentary view illustrating the wiper blade structure of the invention; and,

FIG. **5** is an enlarged cross-sectional view of the construction illustrating additional details taken about the line **5—5** of FIG. **2.**

The subject matter of this invention generally relates to a washing roller adapted to apply fluid to contaminated surfaces in duplicating machines whereby the surfaces can be cleaned in preparation for subsequent duplicating operations. The invention is particularly directed to a wiper blade utilized in combination with the washing roller whereby cleaning fluids which have been contaminated in the course of a cleaning operation are removed from the washing roller whereby the washing roller is prepared for picking up fresh cleaning fluid.

The wiper blade employed in combination with the washing roller preferably comprises an elongated blade which extends parallel with the axis of the washing roller. Means are provided for holding the blade in engagement with the washing roller, and where the washing roller comprises an elastomeric peripheral material, the blade has an area of engagement with the washing roller which is wider than a line contact.

The wiper blade utilized in the practice of the invention is perforated for purposes of providing a means for the passage of contaminated cleaning fluid away from the washing roller. Preferably two or more rows of perforations are provided so that the passage of the contaminated fluid will occur over the entire area of contact between the wiper blade and the elastomeric washing roller.

In the drawings, the structure illustrated comprises a pair of side plates **10** and **12** which provide a supporting arrangement for washing roller **14** and wiper blade

16. As best shown in FIG. 3, the washing roller 14 when in the operating position engages a blanket cylinder or the like 18. The washing roller is movable in a counterclockwise direction while the blanket cylinder is rotating clockwise whereby cleaning fluid can be delivered to the blanket cylinder by the washing roller. The wiper blade 16 engages the washing roller for purposes of removing the contaminated cleaning fluid.

The frame members 10 and 12 also support means for moving the washing roller and wiper blade into an operating position. Specifically, a lever 20 is adapted to be manually moved between the positions illustrated in FIG. 3 for controlling the position of the washing roller and wiper blade. In order to accomplish this, the lever is tied to the end 22 of shaft 24, the end 22 being received for rotation relative to frame member 12 and the opposite end 26 being received for rotation relative to frame member 10.

The shaft 24 carries a pair of screws 28 which are held in position by means of nuts 30. The ends 32 of these screws are rounded, and these ends bear against a cross-member 34. The member 34 includes a main body portion which serves as a support for the blade 16. Specifically, fasteners 36 are received within holes 38 defined by the blade, and these fasteners secure the blade in position on the cross member. A pair of clips 40 are also supported on the cross member, and these clips are adapted to hold the dispensing tube 42 on the cross member. The dispensing tube 42 is provided with a hose connection 44 whereby a hose 46 may be utilized for delivery of cleaning fluid to the dispensing tube.

The cross member 34 defines a pair of end walls 48 which define openings for receiving bolts 50 which are secured by means of nuts 52 and which pivotally connect the cross member to side plates 54 and 56. The bolts 50 also tie springs 53 to the cross member, these springs extending through cutouts 55 defined by the cross member. The ends 57 of the springs are fit onto shaft 58.

A pivoting frame assembly which includes the opposed side plates 54 and 56 is mounted for movement around the horizontally extending shaft 58 which is secured at its ends to the frame members 10 and 12. The plates 54 and 56 each define a rectangular cutout 60 which receives the ends of metering roller 62. The springs 53 are adapted to bear against the end bearings 61 of the metering roller 62 whereby this metering roller is maintained in a fixed spaced relationship with the washing roller 14 during operation.

The shaft 24 also carries a pair of cams 68 defining cam edges 69 which bear against the heads 71 of adjustable screws 73. These screws extend through the rod 75 which is secured to the plates 54 and 56 of the frame assembly. The movement of the cams against the heads 71 therefore drives the frame assembly about the shaft 58 with the springs 77 serving to hold the heads 71 against the cam edges. The springs 77 have a first end attached to studs 79 carried by the frame members 10 and 12. Additional studs 81 are carried by the side plates 54 and 56 for holding the opposite ends of the springs.

The wiper blade 16 defines a plurality of perforations 70 with the perforations being preferably aligned in staggered rows, and with at least two rows of perforations being employed. The washing roller 14 preferably comprises a peripheral portion 72 of elastomeric material, and the wiper blade 16 is adapted to bear against the washing roller whereby a zone of contact between the wiper blade and the surface of the washing roller is developed. The number of rows of perforations is selected to be at least sufficient to cover this zone of contact, however, it will be noted that the perforations are located above and below the edge of the contact zone so that unused cleaning fluid will drain through the blade.

In the operation of the construction, the lever 20 is first moved from the neutral position shown in dotted lines shown in FIG. 3 to the operating position shown in solid lines. This movement results in rotation of the shaft 24 whereby the set screws 28 and cams 68 will be driven against the cross member 34 and the screw heads 71, respectively. In this connection, a horizontally extending tie rod 74 provides support for clips 76 which have one end of springs 78 attached thereto. An additional tie rod 83 may extend between the frame members 10 and 12.

The other ends of the springs 78 are attached to a bottom flange 80 of the cross member 34 whereby the springs 78 normally urge the cross member in a counterclockwise direction. Movement of the pins 28, therefore, drives the cross member against the action of the springs 78. It will be appreciated that when the lever 20 is moved to the neutral position, the springs 78 move the cross member whereby the wiper blade 16 will be withdrawn from contact with washing roller 14.

The action of cams 68 drives the plates 54 and 56 in a clockwise direction whereby the washing roller 14 is moved against blanket cylinder 18 and against tension of springs 77. When in this operating position, the metered cleaning fluid is delivered through pipe 46 into the dispensing tube 42. Openings 80' defined by the tube are spaced uniformly along the length of the tube and therefore provide for delivery of the cleaning fluid along the length of washing roller 14 and metering roller 62. The cleaning fluid is then carried by the washing roller rotation to the nip defined by the washing roller and metering roller 62 whereby a predetermined amount of the cleaning fluid is delivered to the cylinder 18.

The cleaning fluid, together with the washing action of the roller 14 picks up contaminants, and the fluid along with the contaminants is then carried by the washing roller away from the cylinder. A suitable collecting trough 82 is positioned beneath the washing roller and wiping blade. At this point, the wiping blade functions to remove amounts of the contaminated cleaning fluid with the blade design being particularly effective for this purpose. Specifically, the provision of the perforations provides for the passage of the fluid through the perforations whereby substantially all amounts of the contaminated fluid are removed so that the washing roller will thereafter transfer only fresh amounts of the cleaning fluid for additional cleaning of the blanket cylinder.

As explained in the aforementioned Cleybergh application, the washing roller 14 may comprise a scrubbing roller which is operated through the use of a camming roller 84 engaging the tapered ends 86 of the washing roller. This arrangement causes the washing roller to oscillate axially as it revolves whereby a scrubbing action is imparted for cleaning purposes.

The oscillating action of the washing roller **14** provides a particularly effective operation for the wiping blade **16.** Thus, it has been found that the passage of the liquid through the perforations **70** is particularly complete in the case of an oscillating washing roller.

The wiper blade **16** may be formed from various materials particularly a metal strip material. In this connection, the most satisfactory results are obtained where the metal strip material is a sufficiently rigid, abrasive resistant material such as stainless steel, chrome plated steel, and aluminum bronze and beryllium copper alloys. A non-magnetic material may be used to enhance passage of certain liquids through the perforations.

A substantial perforation of the wiper blade is required in order to achieve the purposes of the invention. The blade is preferably provided with perforations in the form of circular holes between 0.03 and 0.06 inches in diameter with the distance between holes being between about 0.1 and 0.20 inches. This close spacing of the holes insures proper flushing of the liquids which is an important feature of the invention.

From two to four rows of perforations have been found to be suitable in the contact area, and the perforations of one row are preferably staggered relative to the perforations in an adjacent row. Additional rows may be employed although an increased number of rows would ordinarily provide perforations substantially out of the zone of contact between the wiper blade and the washing roller, and such perforations do not add significantly to the removal of the cleaning fluids. In one unit constructed in accordance with the construction, four rows of perforations were employed with each perforation comprising a circular hold 0.05 inches in diameter and with the holes being about 0.17 inches apart.

It will be understood that various changes and modifications may be made in the construction described which provide the characteristics of the invention without departing from the spirit thereof particularly as defined in the following claims.

That which is claimed is:

1. In a duplicating machine or the like wherein a surface becomes contaminated and is subjected to repeated cleaning operations, a washing roller for applying cleaning fluid to the contaminated surface, a delivery means for delivering metered amounts of the cleaning fluid into position for pick-up of the fluid by the washing roller, and a wiper engaging said washing roller for purposes of removing contaminated cleaning fluid from the washing roller subsequent to contact of the fluid with the surface to be cleaned, the improvement wherein said wiper comprises an elongated blade extending parallel with the axis of said washing roller, and means for holding said blade in engagement with said washing roller, said blade defining a plurality of perforations in the area of engagement with the washing roller whereby contaminated material including used cleaning fluid is adapted to pass through the perforations during contact of the wiper blade with the washing blade, said perforations comprising holes between 0.03 and 0.06 inches in diameter with the distance between holes being between about 0.1 and 0.20 inches.

2. A construction in accordance with claim **1** wherein said washing roller includes a surface formed of elastomeric material, said wiper blade pressing against said washing roller whereby the area of engagement between said wiper blade and washing roller is wider than a line contact, and including a number of rows of perforations extending longitudinally of the blade whereby the rows of perforations are at least sufficient to cover said area of contact.

3. A construction in accordance with claim **2** wherein a minimum of from two to four rows of perforations are provided.

4. A construction in accordance with claim **3** wherein the perforations of one row are staggered relative to the perforations of an adjacent row.

5. A construction in accordance with claim **1** wherein said holes are about 0.05 inches in diameter with the distance between said holes being about 0.17 inches.

6. A construction in accordance with claim **1** including means for oscillating said washing roller axially while engaged by said wiper blade.

7. A construction in accordance with claim **1** wherein said delivery means comprises a tube for delivering metered cleaning fluid to said washing roller, said tube defining spaced apart openings along its length for distributing the fluid, and including means supporting said tube and said blade, and means for moving said supporting means whereby the tube and blade simultaneously are brought into and away from an operating position.

8. A construction in accordance with claim **7** including independent means supporting said washing roller, and lever means for moving the washer roller support to bring the roller into and out of engagement with said contaminated surface.

9. A construction in accordance with claim **8** wherein said lever means is also connected to said means supporting said tube and blade whereby the tube and blade are moved into operating position simultaneously with said washing roller.

10. A construction in accordance with claim **1** wherein said wiper blade comprises a strip of a substantially rigid, abrasive resistant, material.

* * * * *